

AGGGAGAGTCTGCCACAAGTTTGATATTCTCACTGAGGCATCTATTCAAGTTGGGCAGCAGACA
CTGACCAACGTAGCACGGCAATGCTGGTAGCAATGCCCTGCCAGCACTCAGAAAGACGGAGGCA
GGAGAACATAGCTTCAGTCAGCCCTCTTCTACAATATACTCAGTTGGAAGTCAGCCAGCTTAGACAACA
TGGAGAGCCTGTGCCGAAAGCCACTGGTAAGCCGAATCTCAGTACCGAGAGCTGCCAGGGTGC
CTGC :AAAAAAAAAAACCTCAAACACAGAAGTAGGGAGGTGTAAAATAAGTGTAGGGGGTGGAAATT
AGCTGATGTTGACTTCCAATAAGTACCTTTAGATACCTATTAAATCAATAGCATAGACCTGAAAC
TGTCTATCAGAAAATGTGTCTATTCTGAGGAAGGAGTGTCAACGAGGTTCTGTGAGGGGGCCTCTGGCT
TTGAGAGGGTGTACCATCACATAAGACTCTAAAAGCACACATAACTTTATAAATTACCATGAGCTTAAC
ATCTTCTTGTCAATTGCGAGACTGAGCCATGGAGTCTTCGATGCTGACACCAATTCAACTGACCTACA
CTCACGGCCCTGTTCAACCCCAAGACATGCCCTCATGGTCATTCTGGTCTCACTTGTCTATTGG
CTGCTAGGCAATGGCTGGTGTGGTAGCTGGCGAAAGATGAAGACGACCGTGAACACAGTCTGG
TCCTCCATCTCACCCCTGGCGATTCCCTGCTGCCCTCTGCCCTCTGGCTCACCTGATTCT
CCAAGGACACTGGCCCTATGGCTGTTCTGTGCAAACATTATCCCATCCATTATTCTCAACATGTT
GCCAGTGTCTTCTGCTTACTGCAATTAGCCTGGACCGATGTCTGATAGTACATAAGCCAATCTGG
AGAACATCGAAACGTGAGAACCGCCTCGCCATCTGTTGATGTCTGGTGGTAGCCTTGTGATGT
TGTGCCGTATTGTATACCGTGTCTGTCATTATGACAATCGCAGTATATGTAGATATAATTGAT
TCCTCCAGGTCAATGATTATTGGGACTACGTGTACAAACTAAGTCTACCAGAAAGCAATTCTACTGATA
ACTCCACTGCTCAGCTAACACTGGACATATGAATGACAGGGTCAAGCTCCTCCTGTACAGGCAAGGGATTA
CTTTGGACAGTTACCAACTGCCCTCCAGTCACAGCCATTCTAACATCTCCCTGAAGACTCATTCTCT
GATTCAAGCAACCAACACCCCCATTATGGGGAAAGCCTCTAACATGTCCCTCACAGCCGCCGTACCCAGCG
GGTTTCTGTTGAAGATCGTAAATCCAATACACTGAACGCTGACGCTTTCTCTGCTCACACAGAACT
TTTCCCTACTGCTTCTAGTGGTCAATTATACCCCTATGATTTCAGGGGATTATGTTGACCAATTCA
TATGACAATCATGTGCCGACACCGCTGATGCAATAACCATCACAGGCTGGTGGCTCTGGTGC
CGTTTTCATCATGGTATTGTTACAGCCTCATCGCTTCAGAATGCCAAAAACCAACTTCAACAGTC
TCGGAACAAAACCTTCGGGTGGCTGTGGCTGTGGTCACTGTCTTTTATCTGCTGGACTCCATACCAT
CTTGTGGAGTCCTGCTATTGATTACTGATCCAGAAAGTTCTTGGGGAAAGCTGTGATGCTCTGG
ACATGTCCATTGCTTAGCATCTGCCAATAGTTGCTTCAACCTTCTGTATGCCCTTGGGGAAAGA
CTTTAGGAAGAAAGCAAGACAGTCTATAAGGGCATTCTGGAAAGCAGCCTCAGCGAAGAGCTCACCG
TCTACCAACTGTACCCAAAGACAAAGCCTCTCAGGAAAGACATATGAGTACAGATGTGAGATGT
GCCCTGGGAACCTAACGAGAGTCTCAGGTGAAACAGTGTGATGGTACATGTGAGCAGGACACTT
AGACAATTGGCGACTCTCAGAGAAAGGTCTTATTGACATCAGCATCATTGAAAACATTAAAGATG
TTCAAGCCCCATCCAGATGTGTTACTCAGAATCTCTGGCCATGGGACCACTGTTTAACAGGCC
TTGTTCCATCAGTGTAAATTACCTATTGGCTTAGTCTATTCCCATCCCTGACTACACCATGT
AATGAATAACTTTTACATCTGTTCTGATTCTGATTTCTTCTGATCATCTAAACTTCTAGTTG
CATGGAAGGCTGCTTTATTGTTCTGAATGAAAGATATTCAATTATTGTAACAGTTGTGGTGG
GTGATTTTAAGTGGGGAAAGAGACACAGTAACAAAAAGATCTATGAAAGCAGGGAGTGTGAGTTAG
TTGACAGAACACAGTGCCAATGCCACCCACTAAAGCAACCTGAGATAATTCCAGTGT
AGTGAACAGACAGATAACACACTTCCACTCTGGAGTGTGAGCT
(SEQ ID NO:1)

MESFDADTNSTDLSRPLFQPQDIASMVLGLTCLLGLNGLVLWAGVKMKT
TVNTVFLHLT
LADFLCCLSLPFSLAHLILQGHWPYGLFLKLIPSIIINMFASVFLTAISDRCLIVHKPIWCQNHR
NVRTAFAICGVVVAFVMCPVFVYRDLFIMDNRSICRYNFDSSRSYDYWDYVYKLSLPESNS
TDNSTAQLTGHMNDRSAPSSVQARDYFWTVTTALQSQPFLTSPEDSFSDSANQQPHYGGKPP
NVLTAAPSGFPVEDRKSNTLNADAFLSAHTELFPTASSGHLYPYDFQGDYVDQFTYDNHVPTP
LMAITITRLVVGFLVPFFIMVICYSLIVFRMRKTNFTSRNKTFRVA
AVVTVFFICWTPYHLGVLL
LITDPESSLGEAVMSWDHMSIALASANSFCNPFLYALLGKD
FRKKARQSIKGILEAAFSEELTHST
NCTQDKASSKRNNMSTDV (SEQ ID NO:2)

FIG. 1

underlined = deleted in targeting construct

[] = sequence flanking Neo insert in targeting construct

AGGGAGAGTCTGCCACAGTTTGATATTCTCACTGAGGCATCTATTAGTTGG
GCAGCAGACACTGAGCAGAACGTAGCACGGCAATGCTTAGCAATGCCTGTCGGCCA
GCACTCAGAAGACGGAGGCAGGAGAACATAGCTTCAGTCAGCCTCTCTACAATATA
TCAGTTGGAAGTCAGCCAGCTTAGACAACATGGAGAGCCGT[GCCGAAAGCCACTGGGTA
AGCCCGAATCTCAGTAGCAGAGAGCTGCCAGGGTGCCTACTGC : AAAAAAAAACCTCA
AACAAACAGAAGTAGGGAGGTGTAAGGAAATAAAGTGTAGGGGGTGGAAATTAAAGCTGATGTG
GACTTCAAATAAAAGTTACCTTTAGATACCTATTAAATCAATAGCATAGACCTGAAAC
TGCTCTATCAGAAAATGTGTCTATTCTGAGGAGGTGCTAACGAGGTTCTGTGAGGGGG
GCCCTCTGGCTTGAGAGGGTGTACCATCACATAAGACTCCTAAAGCACATACTTTATA
AATTCACCATGAGCTTAAACATCTTCTTGTCATTTCGCAAGACTGAGCCATGGAGTC
CGATGCTGACCCAATTCAACTGACACTACACTCACGGCCTCTGTTCAACCCCAAGACAT
TG]CCTCCATGGTCATTCTGGTCTCACTTGTCTATTGGACTGCTAGGCAATGGCTGGT
GCTGTGGGTAGCTGGCGTAAGATGAAGACGACCGTGAACACAGTCGGTCTCCATCT
CACCCCTGGCCGATTCCCTTGCTGCCCTCCTGGCTCACCTGATTCT
CCAAGGACACTGGCCCTAT[GGCTTGTCTGTGCAAACATTATCCCACATCATTATTCT
CAACATGTTGCCAGTGTCTTCTGCTTAAGGCCATTAGCCCTGGACCGATGTCTGATAGT
ACATAAGCCAATCTGGGCCAGAACATCGAAACAGTGAGAACCGCCCTCGCCATCTGTGG
ATGTGTCTGGGTGGTAGCCTTGTGATGTGTGCCCCGTATTGTATACCGTGTCTGTT
CATATGGACAATCGCAGTATATGTAGATATAATTGATTCCCTCAGGTATATGATTA
TTGGGACTACGTGT]ACAAACTAAGTCTACCAAGAACATTCACTGATAACTCCACTGC
TCAGCTAACTGGACATATGAATGACAGGTCAAGCTCCTCTGTACAGGCAAGGGATTA
CTTTGGACAGTTACCACTGCCCTCCAGTCACAGCCTAACATCTCCTGAAGACTC
ATTCTCTCTAGATTCAAGAACCAACAACCCATTATGGTGGAAAGCCTCTAACATGTCT
CACAGCCGCCGTACCCAGCGGGTTCTGTGAAGATCGTAATCCAACACTGAACGC
TGACGCTTTCTCTGTCACACAGAACATTCCCTACTGCTCTAGGGTCATTATA
CCCCATGATTCCAGGGGGATTATGGTGAACATTACAGCTATGACAATCATGTGCCGAC
ACCGCTGTGGCAATAACCACATCACAAAGGCTGGCTTCCTGGTGCCTTTCAT
CATGGTAATTGTTACAGGCCATCGTCTTCAGAACATGCCGAAAACCAACTTCACCAAGTC
TCGGAACAAAACCTTCCGGTGGCTGGCTGTGGTCACTGTCTTATCTGCTGGAC
TCCATACCACCTTGTGCGAGCTGCTATTGATTACTGATCCAGAAAGTTCTGGGAA
AGCTGTGATGTCCTGGGACACATGTCCATTGCTTGTGATCTGCCAATAGTTGCTCAA
CCCTTCCTGTATGCCCTTGGGAAAGACTTTAGGAAGAACAGACAGTCTATAAA
GGCATTCTGGAAGCAGCCTCAGCGAAGAGCTCACGCACTTACCAACTGTACCCAAAGA
CAAAGCCTCTCAAAAAGAACATATGAGTACAGATGTGTGAAGATGTGGCCCTGGGAA
CCTAAGCAGAGTTCTCAGGTGAACAGTGATGGATGACATGTGAGCAGGACACTTAGACA
ATTGGCGACTCTCAGAGAACAGGCTCTTATGACATCAGCATCTTGAACATTAAA
GATGAAAATTCAAGCCCCATCCAGATGTGTGACTCAGAACATCTGGCCATGGAC
CAGTGTAAACAGGCCCTTGTGTTCCATCAGTGTAAAGTTTACCTCATTGGCTTAG
TCTATTCCCATCCCTGACTACACCAGTGAATGAATAACTTTTCTGTTTCAGTA
TTCTTTTTTCTGATCATCTAAACTCTAGTTGATGGAGGTGCTCTTATT
GTTCTGAAATGGAAGATATTCAATTATGACAGTTGTGGTGTGACAAGTGTATT
AGTGGGAAAGAGACACAGTAAGAAAAGATCTATGAAAGCAGGGAGTGTGAGTTAGAGT
TTGACAGAACACAGTGCCAAATGCCACCCACTAAAGCAACCTGAGATAATTCCAGTGT
CATGTGAGCAAGTGAGCACAGATAACACACTTTCTACTCCTGGAGTGTAGTTAGA
AGTTGTAGCTGGAGCTC

FIG. 2A

Gene Sequence
Structure * 663 bp Sequence Deleted 859 bp

Size of full-length
cDNA: 2658 bp



Targeting Vector* (genomic sequence)

Construct Number: 3036

Arm Length:
5': 3.2 kb
3': 1.8 kb

Targeting Vector
- - - Endogenous Locus

Not drawn to scale

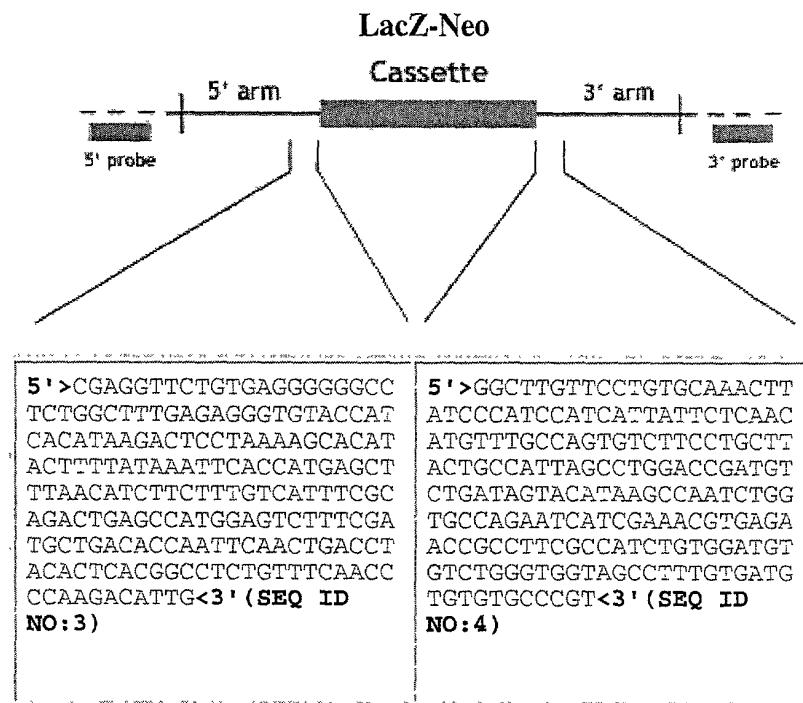
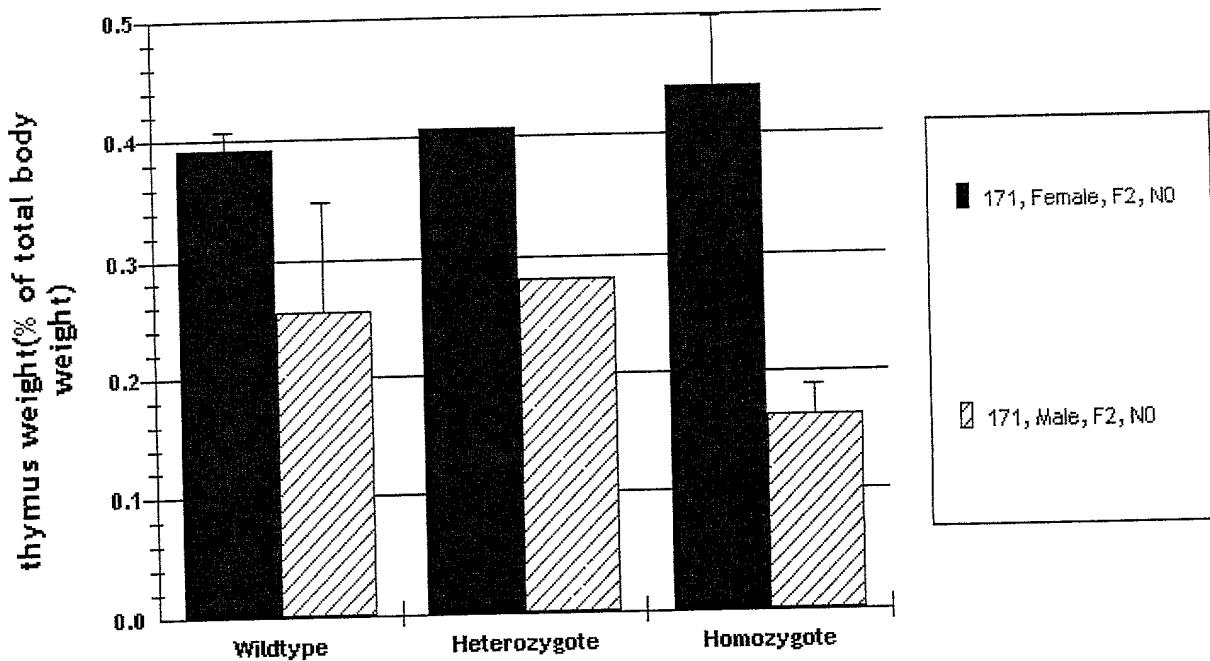


FIG. 2B

necropsy - thymus weight/body weight



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Fig. 3